

## CALIFORNIA ENERGY COMMISSION

1516 NINTH STREET  
SACRAMENTO, CA 95814-5512



**DATE:** November 20, 2007

**TO:** Interested Parties

**FROM:** Ron Yasny, Compliance Project Manager

**SUBJECT: Gateway Generating Station (formerly Contra Costa Power Plant Unit 8)  
(00-AFC-1C) Revised Staff Analysis of the proposed change to anhydrous ammonia as the refrigerant in the inlet air chiller**

On November 5, 2007, PG&E filed a petition with the California Energy Commission requesting Energy Commission approval to allow the use of anhydrous ammonia as the refrigerant in the closed loop of the project's inlet air chiller system for the Gateway Generating Station (formerly known as Contra Costa Power Plant Unit 8). Staff prepared an analysis of this proposed change, and a copy is enclosed for your information and review.

The 530-megawatt project was certified by the Energy Commission on May 30, 2001. Construction of the facility started late in 2001 and was suspended in February of 2002 due to financial difficulties. On July 19, 2006, the Energy Commission approved the addition of Pacific Gas and Electric (PG&E) as co-owner of the project with Mirant Delta, LLC. On January 3, 2007, the Energy Commission approved PG&E's petition to remove Mirant as a co-owner and change the name of the facility to the Gateway Generating Station. PG&E restarted construction in February of 2007. The facility is located on Wilbur Avenue, east of the city of Antioch, in Contra Costa County.

The proposed modifications will allow the Gateway Generating Station to use anhydrous ammonia as the refrigerant in a closed loop as part of the project's inlet air chiller system.

In addition to the attached Hazardous Materials analysis, Energy Commission staff reviewed the petition and assessed the impacts of this proposal in the areas of Public Health and Safety, Traffic and Transportation, Air Quality, Biology, Land Use, Soil and Water, and Visual Resources. The anhydrous ammonia will be maintained in a closed-loop system, and there will be only one delivery. There will be no operational emissions of anhydrous ammonia, and there will be no significant equipment changes. For these reasons, staff has determined that the proposed change to anhydrous ammonia as the refrigerant for the inlet air chiller system will not result in a significant adverse impact in any of these other technical areas with revisions to the existing conditions of certification for HAZ-1, HAZ-4, HAZ-6. It is staff's opinion that, with the implementation of revised conditions, the project will remain in compliance with applicable laws, ordinances, regulations, and standards and that the proposed modifications will not result in a significant adverse direct or cumulative impact to the environment (Title 20, California Code of Regulations, Section 1769).

Interested Parties  
November 20, 2007

The petition to amend the project is available on the Energy Commission's webpage at [www.energy.ca.gov/sitingcases/contracosta/compliance/index.html](http://www.energy.ca.gov/sitingcases/contracosta/compliance/index.html). The Energy Commission's Order (if approved) will also be posted on the webpage. Energy Commission staff intends to recommend approval of the petition at the December 5, 2007 Energy Commission Business Meeting. If you have comments on this proposed modification, please submit them to me at the following address no later than 5:00 P.M., November 30, 2007:

Ron Yasny, Compliance Project Manager  
California Energy Commission  
1516 9<sup>th</sup> Street, MS-2000  
Sacramento, CA 95814

Comments may be submitted by fax to (916) 654-3882, or by e-mail to [ryasny@energy.state.ca.us](mailto:ryasny@energy.state.ca.us). If you have any questions, please contact me at (916) 653-1227.

For further information on how to participate in this proceeding, please contact the Energy Commission's Public Adviser's Office at (916) 654-4489, or toll free in California at (800) 822-6228, or by e-mail at [pao@energy.state.ca.us](mailto:pao@energy.state.ca.us). If you require special accommodations, please contact Lourdes Quiroz at (916) 654-5146. News media inquiries should be directed to Assistant Director, Claudia Chandler, at (916) 654-4989, or by e-mail at [mediaoffice@energy.state.ca.us](mailto:mediaoffice@energy.state.ca.us).

Enclosure: Staff Analysis

**GATEWAY GENERATING STATION (00-AFC-1C)**  
**Request to Amend Hazardous Materials Management Conditions HAZ-1, 4 and 6**  
**Revised Hazardous Materials Management Staff Analysis**  
**Prepared by: Rick Tyler**  
**November 20, 2007**

## **INTRODUCTION**

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On November 5, 2007 Pacific Gas and Electric (PG&E) petitioned the California Energy Commission (Energy Commission) to amend the Gateway Generating Station certification to allow the use of anhydrous ammonia as the working fluid in the inlet air chiller. The inlet air chiller is a closed loop refrigeration system that cools the air entering the gas turbine. The original project involved the use of Refrigerant 134A as the working fluid. Anhydrous ammonia is an Extremely Hazardous Material that poses greater risk than 134A in the event of accidental release. The proposed use would result in the presence of 6,800 gallons (35,000 lbs) of anhydrous ammonia at the facility. Use of anhydrous ammonia at the facility could pose a potentially significant risk that was not analyzed in staff's original analysis or reflected in the Commission's decision regarding the facility. Staff is therefore treating the proposed amendment as a significant change to the facility's existing license.

## **LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS) COMPLIANCE**

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No new LORS apply to the facility that were not identified and evaluated in the Commission's Certification of the project. With the minor modifications proposed, the existing conditions of certification are sufficient to ensure compliance with applicable LORS.

## **ANALYSIS**

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As a result of PG&E's proposal to use anhydrous ammonia instead of Refrigerant 134A, staff requested that PG&E conduct a modeling analysis and assess the probability of a worst case accidental release from the chiller. Staff analyzed the PG&E modeling approach, assumptions and risk assessment and determined that PG&E's analysis reflects a plausible worst case accidental release and that the assumptions used in modeling it are reasonably conservative. PG&E assumed that the entire contents of the chiller would be released over a 10 minute period. It was also assumed that the release would occur as a horizontal jet which produces the highest possible down wind concentrations of ammonia. The release was then modeled using the SLAB dispersion model which accounts for a denser than air plume that would occur with a jet release. It was assumed that the release occurred concurrent with worst case atmospheric dispersion conditions (F stability and 1.5 meter per second winds). This modeling resulted in potentially lethal concentrations of ammonia off site. Because these concentrations would constitute a significant impact, it was necessary for PG&E to assess the risk of such an occurrence. Although the applicable LORS require a water deluge system, ammonia alarms, and rapid notification of emergency response authorities in the event of an accidental release from the facility, no mitigating effect of

these requirements was used in assessing the potential risk associated with the proposed use of anhydrous ammonia at the Gateway facility.

PG&E estimated the risk of equipment failure leading to a 10 minute release of the entire system contents to be less than is  $1.8 \times 10^{-6}$  per year. PG&E further estimated that the worst case metrological conditions would have a probability of .16 per year. The probability of winds in the direction of the maximum population was estimated to be .05 per year. Staff concurs with assumptions used in PG&E's assessment of the probability of a worst case release. Based on this information, staff estimates that the risk of a worst case accidental release is less than  $1.44 \times 10^{-8}$  per year. The population that would be affected in a worst case release would be less than 100. Staff considers risks below  $1 \times 10^{-6}$  with less than 100 potential fatalities to be categorically insignificant. This criterion is the most widely recognized de-minimus risk level utilized in evaluating the risk of human exposure to potential accidental releases of toxic chemicals.

## CONCLUSIONS AND RECOMMENDATIONS

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Large releases of anhydrous ammonia in conjunction with poor atmospheric dispersion conditions can result in injurious or even lethal concentrations of ammonia in the air. Staff requested that PG&E conduct a plausible worst-case analysis of an accidental ammonia release resulting from the proposed use of anhydrous ammonia in the inlet chiller. Staff reviewed the analysis provided by PG&E and agrees that it does reflect a plausible worst-case accidental release and that the risk associated with the proposed use ( $1.44 \times 10^{-8}$  per year) is well below one in one million per year (PG&E 2007). Staff views risks below this level to be categorically insignificant. Staff therefore recommends that the Commission approve PG&E's request to allow use of anhydrous ammonia as the working fluid in the inlet chiller closed loop refrigeration system.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

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Staff has proposed modifications to the Hazardous Materials Management conditions of certification as shown below. (**Note:** Deleted text is in ~~strikethrough~~, new text is **bold and underlined**)

**HAZ-1** No changes are proposed to the condition language, but because PG&E is proposing to add anhydrous ammonia to the list of acceptable hazardous materials allowed onsite, and this list is referenced by the condition as Appendix C, a revised Hazardous Materials table is attached.

**HAZ-4** The aqueous ammonia storage facility **and the anhydrous ammonia inlet chiller system** shall be designed to either the ASME Pressure Vessel Code and ANSI K61.6 or to API 620. In either case, these ~~se storage tank facilities~~ shall be protected by a secondary containment basing capable of holding 150% of the storage volume plus the volume associated with 24 hours of rain assuming the 25-year storm.

**Verification:** At least sixty days prior to delivery of aqueous ammonia to the storage tanks **or anhydrous ammonia inlet chiller system**, the project owner shall submit final design drawings and specifications for these ~~se ammonia storage tank systems~~ and secondary containment basins to the CPM for review and approval.

**HAZ-6** The project owner shall direct all vendors delivering ~~aqueous~~ ammonia to the site to use only tanker truck transport vehicles which meet or exceed the specifications of DOT Code MC-307.

**Verification:** At least thirty (30) days prior to receipt of ~~aqueous~~ ammonia on site, the project owner shall submit to the CPM for review and approval letters from the supply vendors indicating the specifications of the transport vehicles to be used in the delivery of ~~aqueous~~ ammonia to the site.

## REFERENCES

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PG&E 2007 - Petition for Change to the Gateway Generating Station Project Inlet Chiller System, Pacific Gas & Electric, CH2MHILL Sacramento California, November 5, 2007.

AFC 2000 – Application for Certification for Contra Costa Unit 8 Dames and Moore for Southern Company, January 21, 2000.